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Comparison between Scopus, Web of Science, PubMed and publishers for mislabelled review papers

Andy Wai Kan Yeung*

Oral and Maxillofacial Radiology, Applied Oral Sciences, Faculty of Dentistry, The University of Hong Kong, Hong Kong, China

The present study examined the incidence rate of reviews being mislabelled by Scopus, and compared this rate with Web of Science (WoS), PubMed and official websites of publishers. Top 400 cited publications defined by Scopus as 'articles' were examined. Their contents were evaluated to see if any were actually reviews. These publications were cross-checked in WoS, PubMed and publisher websites to identify the assigned document type labels. Out of the 400 Scopus 'articles', 117 were reviews (29.3%). The official websites of publishers had 16.0% incidence of mislabelled reviews, which was less than Scopus (29.3%) but more than WoS (14.1%) and PubMed (1.9%).

Keywords: Document types, library science, information science, periodical articles, reviews.

Multiple databases such as Scopus, Web of Science (WoS) and PubMed index biomedical publications. The data and meta-data associated with the publications are useful for library science and bibliometric evaluations such as citation analyses. Each database has its own advantages and shortcomings; for instance, PubMed can be accessed for free, whereas Scopus and WoS track the citation count of the publications[1]. It is intuitive to recognize that each database has a different collection of literature tracked/indexed and possesses different features that provide different results for citation analyses. For example, it has been reported that Scopus covers a broader biomedical literature particularly the non-English-language sources[1,2] but WoS tracks older citations better[3]. Meanwhile, another study has concluded that WoS classifies journals more accurately than Scopus[4]. More recent studies have pointed out that there are discrepancies and inaccuracies in the funding and affiliation information indexed by Scopus, WoS and PubMed[5,6]. One important aspect that is yet to reach a consensus is the accuracy of document type label, known as 'document type' in Scopus and WoS and 'publication type' in PubMed. For instance, a recent survey by Donner[7] reported 17% document mislabelling by WoS, and 24% by Scopus[7]. Besides, the differences in document type labelling by WoS and Scopus have caused up to 50% discrepancy in original article count in various pharmacology journals when the two databases were compared – though the exact ratio of mislabelling has not been reported[8]. Another

*e-mail: ndyeung@hku.hk

study reported that on an average of nine disciplines, 52–78% of publications labelled as reviews by WoS were actually not reviews[9]. Meanwhile, it is believed that WoS has labelled letters and notes as articles since the 1990s[10]. Document type is an important data label for bibliometric analyses as researchers often rely solely on the classification by the databases for detailed analyses, such as to compare citation counts between original articles and reviews[1]. According to Teixeira *et al.*[11] and also Miranda and Garcia-Carpintero[12], reviews were generally cited three times more than original research articles, and 'classification of reviews in this database [WoS] can be inaccurate', and hence manual screening was required.

One potential argument here could be that there exist different definitions of a 'review'. Though Teixeira *et al.*[11] did not explicitly define a review, WoS defines a review as 'a renewed study of material previously studied. Includes review articles and surveys of previously published literature. Usually will not present any new information on a subject' (https://images.webofknowledge.com/images/help/WOS/hs_document_type.html). Meanwhile, Scopus defines a review as 'significant review of original research, also includes conference papers… reviews typically have extensive bibliography. Educational items that review specific issues within the literature are also considered to be reviews. As non-original articles, reviews lack the most typical sections of original articles such as materials and methods and results' (https://www.elsevier.com/__data/assets/pdf_file/0007/69451/0597-Scopus-Content-Coverage-Guide-US-LETTER-v4-HI-singles-no-ticks.pdf). The United States National Library of Medicine (NLM), the agency of PubMed, defines a review as 'an article or book published after examination of published material on a subject. It may be comprehensive to various degrees and the time range of material scrutinized may be broad or narrow, but the reviews most often desired are reviews of the current literature. The textual material examined may be equally broad and can encompass, in medicine specifically, clinical material as well as experimental research or case reports. State-of-the-art reviews tend to address more current matters. A review of literature must be differentiated from a historical article on the same subject, but a review of historical literature is also within the scope of this publication type' (https://www.nlm.nih.gov/mesh/pubtypes.html). Though the three definitions vary in length and content, they seem to share a common ground that a review should mainly be an examination or summary of existing literature, without presenting new or novel materials and findings.

Regardless of the definitions used to define a review, the author similarly encountered such inaccuracy of document type labelling as Teixeira *et al.*[11] during the preparation of an earlier work. However, it was unclear how frequently the reviews were mislabelled by the major biomedical literature databases. Therefore, the author conducted the current study that screened for a small predefined body of literature from Scopus, and cross-checked the same with WoS, PubMed and official websites of publishers. Given that the official websites of publishers are the primary sources of information, it was hypothesized that the official websites of publishers would give the most accurate document type labels to the publications than Scopus, WoS and PubMed.

There have been no similar studies published before, which can act as a reference to determine the sample size. The literature on sampling issues in bibliometric analysis was consulted, without a viable established solution[13].The sample was initially defined as the 200 most cited publications, concerning food and nutritional sciences, labelled as 'articles' according to a search in Scopus on 1 June 2018. The search string can be referred from a previous study[14], which was: TITLE-ABS-KEY (nutraceutical OR nutraceuticals OR 'functional food' OR 'functional foods' OR superfood OR superfoods OR 'super food' OR 'super foods'). This original sample size of 200 was conveniently chosen because these 200 'articles' had already been collected and evaluated in terms of their research topic and citation data in the referenced study. However, it was found that only 129 of these 200 publications were indexed in PubMed. To make a more meaningful comparison between the databases, an additional 200 most cited 'articles' following the initial list were added to the analysis. In the end, a total of 400 'articles' were evaluated to see if they were actually mislabelled reviews. Since different research fields may have different citation behaviours, Martinez *et al.*[15] advocated the adoption of the *H*-index concept to a pre-defined body of literature to call those highly cited papers '*H*-classics'. Similar to *H*-index, *H*-classics means there are *h* papers that has each received at least *h* citations. This method should have defined the highly cited body of literature more rationally, instead of the 'top 100 (or 200) most cited'. Therefore, the current sample size of 400 has already included all the 219 H-classics in the searched body of literature, identified in Scopus on 14 September 2018.

A publication was determined to be a review if: (1) The publication title or abstract clearly mentioned the word 'review' indicating that it was a review, or the journal title clearly indicated that it only published 'reviews'; (2) The abstract indicated that was mainly an overview; or (3) By reading the full text, the publication was determined to be a review that fulfilled the definition of a review listed in the introduction of the current manuscript, as 'mainly an examination or summary of existing literature, without presenting new or novel materials and findings'. Then, these 400 'articles' were cross-checked in WoS, to see if they were labelled as: (1) article; (2) review; (3) others (e.g. note, letter); or (4) not indexed in WoS. PubMed was similarly cross-checked, with an additional option of 'unclassified'. It should be noted that it is MEDLINE that assigns publication type label to a

Table 1. Document type labels given to the 400 Scopus 'articles' by different sources

	Scopus	WoS	PubMed	Publisher
No. of publications indexed (A)	400	389	258	400
No. of the 117 reviews indexed	117	111	79	117
Labelled as reviews	0	56	65	34
Labelled wrongly (B)	117	55	5	64
As articles	117	53	0	52
Others	0	2	5	12
Labelled as unclassified			9	19
Incidence of mislabelled reviews (B/A)	0.293	0.141	0.019	0.160

117 of the 400 'articles' were actually reviews.

Figure 1. A representative example of a review being mislabelled by Scopus.

publication, but PubMed-indexed publications are not necessarily MEDLINE-indexed. Therefore, 'unclassified' was not perceived as mislabelled for the analyses of the current study. Meanwhile, MEDLINE/PubMed has many publication type labels and all labels indicating experiments or lab studies (e.g. comparative study, clinical trial) were treated by the current study as 'articles'. Finally, the 400 'articles' were checked in the publisher websites for the labelling.

Upon manual screening, 117 of the 400 Scopus 'articles' (29.3%) were found to be reviews: 66 were directly identified from the publication title, abstract or journal title, 9 were indicated as an overview in the abstract, and the remaining 42 were identified by reading the full text. Table 1 lists the labelling of the 117 reviews by various sources. For the complete labelling data of all the 400 publications, please see the Supplementary Excel file. One representative example is shown in Figure 1.

Figure 2 shows two mislabelled examples from publisher websites, one each from Elsevier and Taylor and Francis. The review paper shown in the upper panel indicated the document type in its title, but Elsevier labelled it as an original research article. The review paper shown in the lower panel was published in a journal that publishes reviews only, but Taylor and Francis labelled it as an original article. Surprisingly, the official websites of publishers had 16.0% incidence of mislabelled reviews (Table 1), which was less than Scopus (29.3%) but more than WoS (14.1%) and PubMed (1.9%). PubMed has the lowest mislabelling rate. It is true to say that some PubMed-indexed publications were unclassified because they were not indexed by MEDLINE, which is responsible for the publication type labels. However, some MEDLINE-indexed publications did not have any publication type labels indeed (Figure 3).

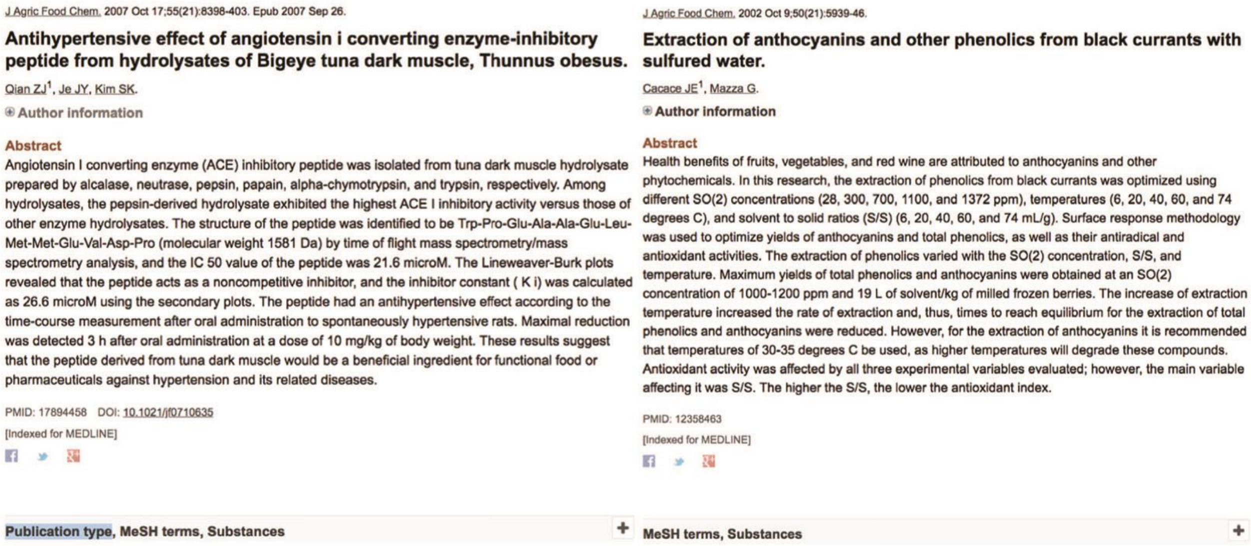
For the 34 reviews correctly labelled by the publishers, WoS correctly labelled 23 (23/33 = 69.7%) and mislabelled 10 (1 not indexed); whereas PubMed correctly labelled 22 (22/23 = 95.7%) and mislabelled 1 (2 unclassified and 9 not indexed). For the 64 reviews mislabelled by the publishers, WoS correctly labelled 28 (28/62 = 45.2%; 2 not indexed); whereas PubMed correctly labelled 31 (31/34 = 91.2%; 4 unclassified and 26 not indexed). It appeared that the labelling accuracy of the PubMed/MEDLINE database for review publications was always much higher than WoS, irrespective of the label assigned by publishers.

Document type label is an important feature of bibliometric databases for users to sort their search results, and forms the basis to define a body of literature for further publication and citation analyses[1,2,16–21]. As reviews are more cited than original articles in general[11], Clarivate

Figure 2. Two representative examples of reviews being mislabelled by the official websites of publishers.

Analytics recently introduced the citation distribution histogram in the latest 2018 Journal Citation Reports, which not only separately displays the median citation counts of reviews and articles by each journal, but also the ratio of articles to reviews in each citation count interval. These analyses may be confounded and undermined if the document type labels were inaccurate, which may in turn influence the decisions of librarians and their institutions in subscribing to those biomedical journals.

It was revealed that Scopus had the highest incidence rate of 35.5% for mislabelled reviews, followed by official websites of publishers and WoS. PubMed seemed to be the most accurate with regards to document type labels. The author contacted WoS, Scopus and PubMed by filing online inquiry forms to better understand their workflow of assigning the document type labels. WoS replied that the Journal Citation Reports production team was responsible for assigning the document type labels and the assignment was based on the document's actual bibliographic characteristics, but not of the editorial intention of the publishers. Scopus replied that their automated identifier was responsible for assigning the document type labels, mainly based on the publisher labels, and no specific team or person validated the contents for



J Agric Food Chem. 2007 Oct 17;55(21):8398-403. Epub 2007 Sep 26.

Antihypertensive effect of angiotensin i converting enzyme-inhibitory peptide from hydrolysates of Bigeye tuna dark muscle, Thunnus obesus.

Qian ZJ[1], Je JY, Kim SK.

Author information

Abstract

Angiotensin I converting enzyme (ACE) inhibitory peptide was isolated from tuna dark muscle hydrolysate prepared by alcalase, neutrase, pepsin, papain, alpha-chymotrypsin, and trypsin, respectively. Among hydrolysates, the pepsin-derived hydrolysate exhibited the highest ACE I inhibitory activity versus those of other enzyme hydrolysates. The structure of the peptide was identified to be Trp-Pro-Glu-Ala-Ala-Glu-Leu-Met-Met-Glu-Val-Asp-Pro (molecular weight 1581 Da) by time of flight mass spectrometry/mass spectrometry analysis, and the IC 50 value of the peptide was 21.6 microM. The Lineweaver-Burk plots revealed that the peptide acts as a noncompetitive inhibitor, and the inhibitor constant (K i) was calculated as 26.6 microM using the secondary plots. The peptide had an antihypertensive effect according to the time-course measurement after oral administration to spontaneously hypertensive rats. Maximal reduction was detected 3 h after oral administration at a dose of 10 mg/kg of body weight. These results suggest that the peptide derived from tuna dark muscle would be a beneficial ingredient for functional food or pharmaceuticals against hypertension and its related diseases.

PMID: 17894458 DOI: 10.1021/jf0710635

[Indexed for MEDLINE]

Publication type, MeSH terms, Substances

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Extraction of anthocyanins and other phenolics from black currants with sulfured water.

Cacace JE[1], Mazza G.

Author information

Abstract

Health benefits of fruits, vegetables, and red wine are attributed to anthocyanins and other phytochemicals. In this research, the extraction of phenolics from black currants was optimized using different SO(2) concentrations (28, 300, 700, 1100, and 1372 ppm), temperatures (6, 20, 40, 60, and 74 degrees C), and solvent to solid ratios (S/S) (6, 20, 40, 60, and 74 mL/g). Surface response methodology was used to optimize yields of anthocyanins and total phenolics, as well as their antiradical and antioxidant activities. The extraction of phenolics varied with the SO(2) concentration, S/S, and temperature. Maximum yields of total phenolics and anthocyanins were obtained at an SO(2) concentration of 1000-1200 ppm and 19 L of solvent/kg of milled frozen berries. The increase of extraction temperature increased the rate of extraction and, thus, times to reach equilibrium for the extraction of total phenolics and anthocyanins were reduced. However, for the extraction of anthocyanins it is recommended that temperatures of 30-35 degrees C be used, as higher temperatures will degrade these compounds. Antioxidant activity was affected by all three experimental variables evaluated; however, the main variable affecting it was S/S. The higher the S/S, the lower the antioxidant index.

PMID: 12358463

[Indexed for MEDLINE]

MeSH terms, Substances

Figure 3. Examples of PubMed-indexed publications, which were also MEDLINE-indexed, with and without publication type labels.

the indexing. PubMed replied that the NLM indexers were responsible for assigning the publication types for items indexed in MEDLINE; while some of them reflected the format and editorial practices of the individual journal, others reflected the indexer's analytical judgment. Besides, publication types of items indexed before 1991 were assigned by a machine. These pieces of information imply that document type labels may be heterogeneous in various databases due to different practices. Based on the findings of the current study, researchers who conduct bibliometric analyses that depend on or involve document type labels should develop a two-tier selection strategy. Extra steps should be taken to screen for the abstracts and/or full text, to identify the true document type.

Results from the current study indicated that the PubMed database is the most accurate in assigning document type labels compared to WoS and Scopus, which can be an important consideration for librarians, researchers and academicians working in the medical field or healthcare sector, when such a parameter is used for subscribing to journals, conducting a literature review or evaluating academic performance. Readers should consider certain limitations of the current study when they interpret the results. First, the screened sample was quite small. The inaccurate document type labels certainly existed in various biomedical literature databases, but the selection of a different dataset may lead to a different incidence rate and conclusions. Meanwhile, the surveyed sample focused on food science and nutrition, which may be different from the samples surveyed by existing literature on the topic of document type labels, such as in social science[9], pharmacology[8], and in general[7]. As these results are clearly heterogeneous, readers should refer to the values according to their research fields, if they match the surveyed samples. Also, it was not possible to obtain the document type labels selected by the authors during their manuscript submission stage. Those labels might be considered as a better and unbiased gold standard. Nonetheless, the results of the current study imply that document type labels should be assigned to publications more accurately by various parties involved in the scientific publications.

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Improving groundwater recharge by ventilation of unsaturated zone

V. K. Haritha and L. Elango*

Department of Geology, Anna University, Chennai 600 025, India

Groundwater recharge is affected by the entrapment of air in the unsaturated zone. During the infiltration process, air phase moves ahead of the wetting front and confined air mass resists wetting front propagation. This study aims at assessing the feasibility of improving groundwater recharge by providing ventilation in the unsaturated zone through the removal of entrapped air. In a laboratory sand column, ponded infiltration tests were carried out by providing vents of different diameters. Increase in diameter and number of vents improved the infiltration rate. Thus, simple pipes of any diameter inserted within the unsaturated zone beneath the recharge structures such as check dams, percolation ponds, surface spreading, etc. will lead to rapid increase in infiltration rate.

Keywords: Groundwater recharge, infiltration, unsaturated zone, ventilation.

THE ever-increasing dependence on groundwater to meet the water supply demand of the growing population, rising need for higher food production and industrial revolution has led to the depletion of groundwater resources and consequently the decline in water table. Over-exploitation of groundwater is a problem in several parts of the globe. In India, it is a serious issue and it has become difficult to sustain the boom in groundwater use[1,2]. Other factors like erratic variation in annual rainfall, rapid urbanization and ill-maintained surface water bodies, have attributed to the drastic decrease in groundwater recharge. Changing climate and its subsequent impact on rainfall has also resulted in the reduction of groundwater recharge[3]. Extreme rainfall events are on the increase leading to increased runoff[4]. To overcome the depletion of groundwater resources, several measures have been taken in various parts of the world. Groundwater recharge has been improved by implementing managed aquifer recharge (MAR) structures such as check dams, percolation ponds, rooftop rainwater harvesting, injection wells, etc. Construction of such MAR structures helps to increase the recharge by harvesting the rain water and reducing the runoff[5]. The potential for increasing recharge by the implementation and planning of such rainwater harvesting structures has to continue and grow in India[6–8]. As per the 2013 master plan by the Central Groundwater Board (CGWB)[9] the estimated cost to artificially recharge an area of 941,541 km^2 in India was INR 791,780 million. Thus, many MAR structures are being constructed in India to overcome groundwater depletion. But maintenance of

*For correspondence. (e-mail: elango34@hotmail.com)